July 2002

Chile

Chile has limited indigenous energy resources and relies primarily on imports to meet its rapidly growing energy demand. In recent years, Chile has emerged as one of Latin America's most successful economies.

Note: Information contained in this report is the best available as of July 2002 and can change.

BACKGROUND

In the year 2000, exports accounted for around two-fifths of Chile's gross domestic product (GDP). Mineral resources constitute most of the country's exports, with copper alone accounting for 40%. Accordingly, Chile's economic performance is highly dependent on external demand and commodity prices. A world economic slowdown, coupled with a 13% decline in copper prices during 2001, resulted in economic growth of 2.8% for the year.

Chile's economic growth rates, while recently modest, have been among the world's highest in the past decade. Chile is considered to have one of the South America's soundest and most open economies and is a party to several bilateral trade agreements. Chile is also an associate member of Common Market of the Southern Cone, MERCOSUR, and has been in prolonged negotiations with the United States about inclusion in the North American Free Trade Agreement (NAFTA) and the proposed Free Trade Area of the Americas (FTAA). In April 2002, Chile entered into a trade agreement with the European Union whereby both sides will eliminate all import tariffs between them over the next ten years.

ENERGY

Chile has limited indigenous energy resources and relies on imports for most

of its hydrocarbon needs. Crude oil comes primarily from Argentina, Ecuador, Nigeria, and Venezuela, and is processed by one of the country's three state-owned refineries. Natural gas is imported via pipelines from Argentina. A significant amount of the country's electricity is supplied domestically by hydroelectric generators.

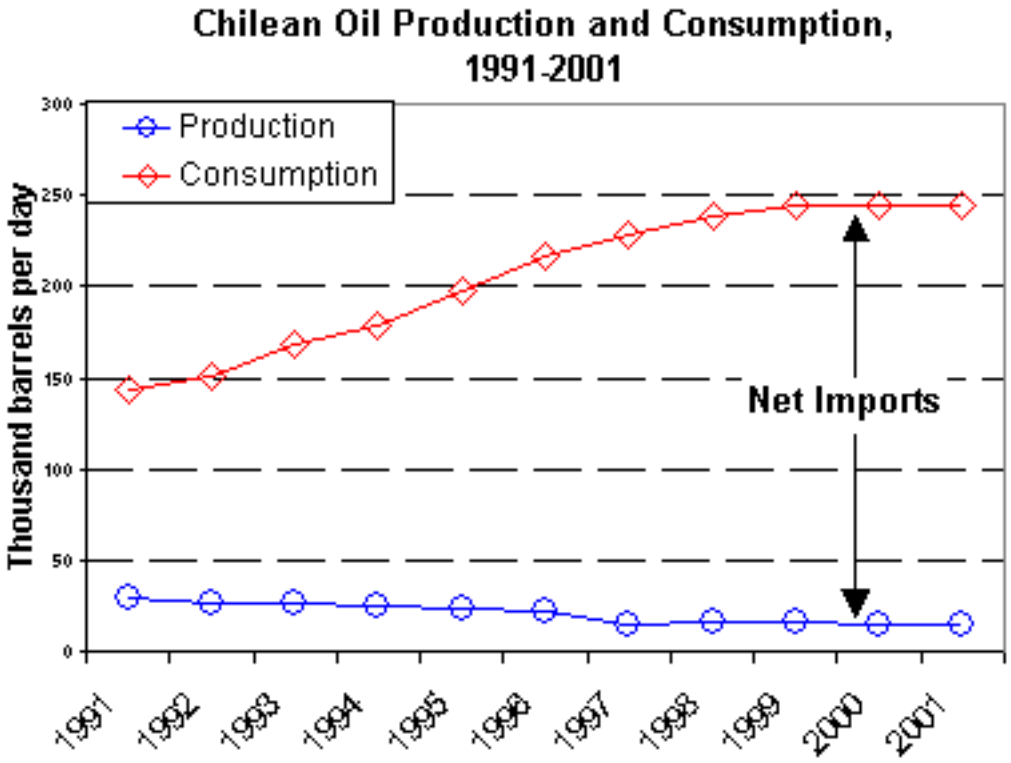
Chile's energy sector is mostly privatized. Energy policy decisions are the shared responsibility of the National Energy Commission, the Ministry of the Economy, the Superintendency of Electricity and Fuels, and the Chilean Commission on Nuclear Energy.

OIL

Chile is a small oil producer, with an output of only 14,000 barrels per day (bbl/d), and proven reserves of 150 million barrels in 2001. Chile consumed 245,000 bbl/d in 2001, resulting in net imports of 231,000 bbl/d. Chile's main sources of oil imports are Argentina, Ecuador, Nigeria, and Venezuela.

Upstream

Chile's domestic hydrocarbon reserves are concentrated in the Magallanes basin, located on the country's southern tip, known as Tierra del Fuego. Production has been in decline for approximately twenty years as existing wells are maturing and exploration efforts elsewhere have proven unsuccessful. Empresa Nacional de Petroleo (ENAP), Chile's national oil company, is the operator in Magallanes and is seeking joint venture partners to reactivate its idle and declining fields. ENAP also commands a foreign exploration subsidiary, Sipetrol. Sipetrol operates in Argentina, Colombia, Venezuela, Peru, and Ecuador in conjunction with local firms to develop fields which in turn supply the Chilean market.



Downstream

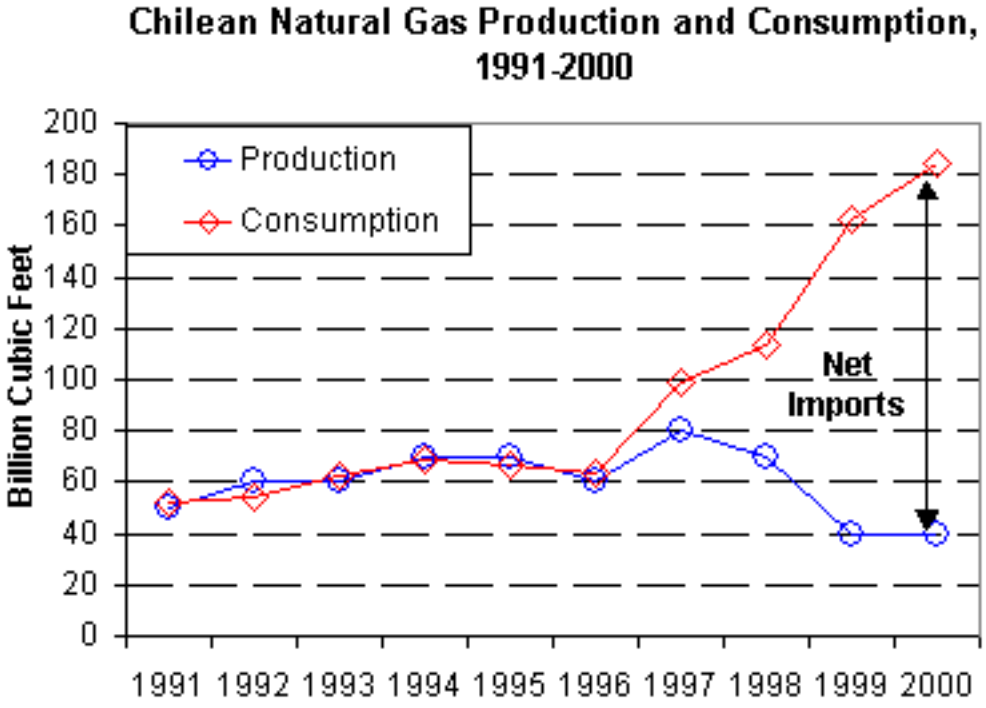
Chile has three refineries, all of which are controlled by ENAP. The largest is the Petrox SA facility, which has an approximate crude throughput capacity of 100,640 bbl/d, and is located near the city of Talcahuano. Petrox controls 41% of the domestic market and is supplied with imported crude oil by the Transndino pipeline, which extends from Argentina's Neuquen Basin westward to the refinery. The Petrox refinery is currently undergoing significant expansion, with numerous new facilities under construction. Developments include modernized port facilities, two new sulfur recovery plants, and an expansion of the refinery's propylene and polyethylene facilities.

The country's second largest refinery is the Refinería de Petróleo Concon, which has a capacity of approximately 94,350 bbl/d and is located north of Santiago. ENAP has signed a letter of intent to construct a new delayed coker at its Concon refinery which will allow the company to process up to 20,000 bbl/d of heavy oil into petroleum coke for the domestic market.

Gregorio-Magallanes, the country's smallest refinery, has a capacity of 9,859 bbl/d. The refinery is located in the south and is connected to a separate pipeline system associated with the Magallanes basin.

Because of Chile's growing oil import dependency, Santiago has developed an Oil Stabilization Fund (FEPP). The fund was created in 1991 and works to stabilize prices for Chilean consumers, providing subsidies when oil prices

are high and charging taxes to bolster the fund when oil prices are low. High oil prices in past few years have stretched the fund such that fuel prices have risen several times since 2000.



NATURAL GAS

Chile has natural gas reserves of about 3.5 trillion cubic feet (Tcf) and produced 40 billion cubic feet (Bcf) in 2000, representing a 30% decline in domestic production since 1996. Conversely, the country consumed 184 billion cubic feet (Bcf) of natural gas in 2000, almost three times its 1996 consumption levels (see graph). Dwindling production and rapidly expanding demand has resulted in Chile becoming a highly dependent net natural gas importer. Chile imported 144 Bcf of natural gas in 2000, all of which came from Argentina.

Since 1997, four natural gas pipelines have been built between Chile and Argentina. These pipelines, along with the lines already in place, extend from Argentina's producing natural gas fields westward to Chile's urban centers and power generators. Power generators are the country's largest consumers of natural gas.

Recent unrest in Argentina has prompted ENAP to assess the security of its downstream operations. In March 2002, after labor unrest in Argentina triggered temporary supply disruptions to Chilean distributors, ENAP concluded that its thermoelectric generators could survive for only five days in the event of a prolonged suspension of Argentine natural gas exports.

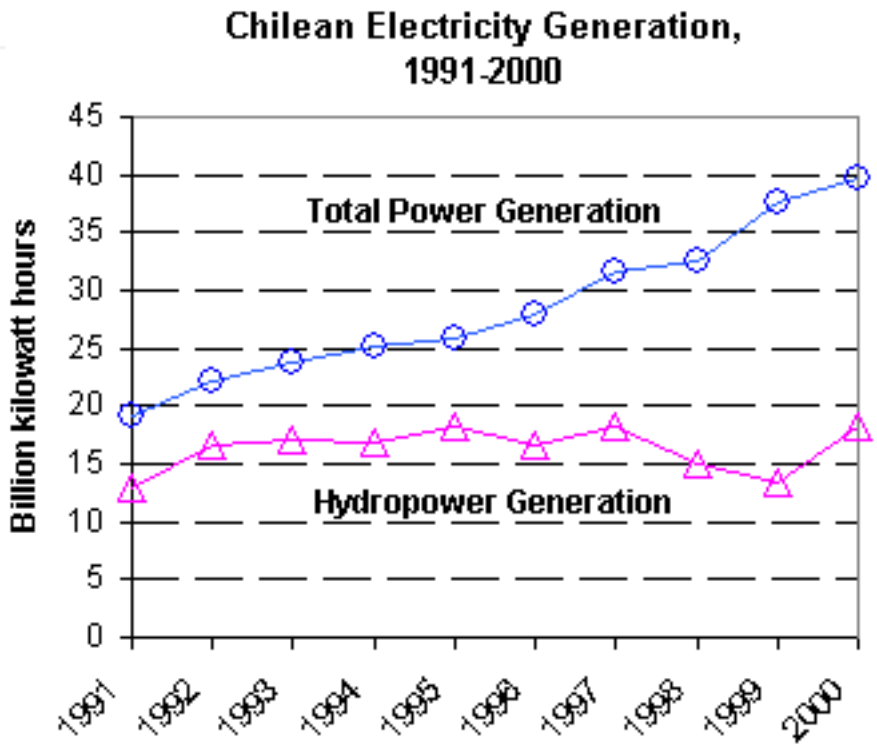
Chile is seeking to diversify its fuel mix by moving away from hydroelectric power and towards gas-fired electric generation. Eight new gas-fired plants are planned for completion by 2010. According to GasAtacama, natural gas distributor between Chile and Argentina, the ratio of hydroelectric to natural gas-fired electricity generation will reverse from 40:60 in 2001, to 60:40 by 2010. Droughts and heavy rains in recent years have compromised the country's power grids, which are heavily dependent on hydroelectric power, resulting in rolling blackouts in Santiago.

Chile may also become a port facility for Bolivian natural gas en route to the United States and Mexico. Known as the Pacific LNG project, consortium members are Totalfinaelf, Repsol, BG, and BP. The project entails a $5 billion investment in transportation and port facilities to take natural gas from landlocked Bolivia out to sea. Chilean port cities are competing with Peruvian ones for inclusion in the project. Bolivian President Jorge Quiroga has said that he will announce his country's decision before his mandate expires on August 6, 2002.

COAL

Chile has total recoverable coal reserves of 1,302 million short tons (Mmst), and produced 0.4 Mmst in 2000. Consumption in 2000 totaled 5.1 Mmst, making Chile a net coal importer of 4.7 Mmst. Most imported coal comes from Australia. Domestic coal production is located in the Lota/Coronel area and in the extreme south on Tierra del Fuego. The country's largest coal mine closed in 1997, and only two small mines remain in operation.

The power sector is the country's largest coal consumer with coal has functioning largely as a back-up to hydropower. Coal use for power generation is slated to fall in coming years as natural gas fuels more of Chile's electricity



ELECTRICITY

Chile consumed about 37.9 billion kilowatt hours (bkwh) of electricity in 2000, 18.3 bkwh of which was generated by hydropower. Hydropower from westward flowing rivers from the Andes Mountains has historically been Chile's single largest electricity source, at times comprising over half of the country's installed electric generation capacity. Severe drought from late 1997 until well into1999, crippled the country's electricity sector and caused rolling blackouts in Santiago. As a result, Chile is working to become less reliant on hydropower.

Chile has four electric grids in operation: the Central Grid (SIC), which relies chiefly on hydroelectric power to service over 90% of Chile's population; the Northern Grid (SING), which is mainly thermal and serves mostly mineral-processing centers in the North; and the Aisén and the Magallanes systems, which are both located in the South of the country, and serve remote areas with a combined generation capacity of about 1% of the country's total. Coordination within each system is carried out by the Economic Dispatching Center (CDEC), an autonomous entity composed of members from all utilities within each system to ensure efficiency and security of the electric system. Aside from these four grids, "self producers" account for about 12% of national generation.

With energy demand forecasted to grow by 7% annually, several new power generators being developed. Endesa (Spain) is developing the 570-MW Ralco hydroelectric project, located on the Bio Bio river, 310 miles south of Santiago. The project will account for an 18% boost in production to the SIC's

current power supply. Completion was originally expected in 2003, but may be delayed due to pending litigation filed by displaced indigenous people as well as by damage caused by heavy rains in June 2001. Tractebel (Belgium) is also building a 480-MW plant to begin operation in 2005. A combined-cycle facility is being developed adjacent to the existing Nueheco I plant in Quillota. The completion of the gas turbine facilities is expected in May 2003, adding 250 MW to the grid, while the steam facilities are expected to come online in March 2004, boosting the new plant's capacity to 370 MW.

ENVIRONMENT

The primary environmental threats to Chile are air pollution from vehicle and industrial emissions, water pollution from untreated industrial sewage, deforestation and soil erosion. Air pollution in Santiago is the most obvious and severe environmental problem in Chile.

Mitigating threats to the environment, however, is the increasing use of alternative fuels in Chile's industrial and energy sectors. Reliance on natural gas and hydroelectric generation to power the country has kept total carbon emissions in check over the past decade. In 2000, total carbon emissions actually fell for the year as GDP grew by 4.4%.

The continuing evolution of Chile's fuel mix away from petroleum and coal is key to the country's environmental future. With total energy demand expected to continue to grow by 7% annually, and air pollution in Santiago already reaching critical levels, energy policies in Chile have commanded the attention of the country's current leadership, international donor organizations, and the private sector.

COUNTRY OVERVIEW

President: Ricardo Lagos (since March 2000)
Independence: September 18, 1810 (from Spain)
Population (2001E): 15,328,467
Location/Size: Southern South America/757,000 sq km (292,000 sq mi), slightly smaller than twice the size of Montana

Major Cities: Santiago (capital), Concepción, Valparaíso, Antofagasta, Puerto Montt, Punta Arenas
Languages: Spanish
Ethnic Groups: White and White-Amerindian 95%, Amerindian 3%, other 2%
Religions: Roman Catholic (89%), Protestant (11%)
Defense (8/98E): Army (51,000), Air Force (13,500), Navy (30,000), Paramilitary Security Forces (29,500)

ECONOMIC OVERVIEW

Minister of Finance: Nicolas Eyzaguirre Guzman
Central Bank President: Carlos Massad
Currency: Peso
Market Exchange Rate (07/17/02): US$1 = 697.2 Pesos
Nominal Gross Domestic Product (GDP, 2001E): $64.2 billion
Real GDP Growth Rate (2001E): 2.8% **(2002F):**3.0%
Inflation Rate (consumer prices, 2001E): 3.6% **(2002F):** 2.5%
Major Export Products: Copper, cellulose, chemicals, salmon, wood products, mollusks, wine
Major Export Destinations: United States, Japan, United Kingdom, China
Major Import Products: Raw materials excluding petroleum, crude petroleum, capital goods, consumer goods
Major Import Origins: United States, Argentina, Brazil, China
Unemployment Rate (November 2001): 8.9%
Trade Balance: (2001E): $1.6 million **(2002E):** $1.8 million
Total Foreign Debt (2001E): $37 billion **(2002E):** $38 billion

ENERGY OVERVIEW

Minister of Mining and Energy: Jorge Rodriguez Grossi
Proven Oil Reserves (1/1/02): 150 million barrels
Oil Production (2001E): 14,000 barrels per day (bbl/d)
Oil Consumption (2001E): 245,000 bbl/d
Net Oil Imports (2001E): 231,000 bbl/d
Natural Gas Reserves (1/1/02E): 3.46 trillion cubic feet (Tcf)

Natural Gas Production (2000E): 40 billion cubic feet (Bcf)
Natural Gas Consumption (2000E): 184 Bcf
Net Natural Gas Imports (2000E): 144 Bcf
Recoverable Coal Reserves (2000): 1.3 billion short tons
Coal Production (2000E): 0.4 million short tons (Mmst)
Coal Consumption (2000E): 5.1 Mmst
Electric Generation Capacity (2000E):10 million kilowatts (4.0 of which is hydropower)
Electricity Generation (2000E): 37.6 billion kilowatthours (bkwh, of which 13.3 bkwh was hydropower)
Electricity Consumption (2000E): 37.9 Bkwh (of which 18.3 bkwh was hydropower)

ENVIRONMENTAL OVERVIEW

Total Energy Consumption (2000E): 1.03 quadrillion Btu (0.26% of world total energy consumption)
Energy-Related Carbon Emissions (2000E): 15.14 million metric tons of carbon (0.23% of world carbon emissions)
Per Capita Energy Consumption (2000E): 67.9 million Btu (vs. U.S. value of 351.0 million Btu)
Per Capita Carbon Emissions (2000E): 1.0 metric tons of carbon (vs. U.S. value of 5.6 metric tons of carbon)
Energy Intensity (2000E): 12,672 Btu/ $1995 (vs. U.S. value of 10,918 Btu/ $1995)**
Carbon Intensity (2000E): 0.19 metric tons of carbon/thousand $1995 (vs. U.S. value of 0.17 metric tons/thousand $1995)**
Sectoral Share of Energy Consumption (1998E): Residential (21.4%), Industrial (50.4%), Transportation (23.6%), Commercial (4.6%)
Sectoral Share of Carbon Emissions (1998E): Transportation (32.1%), Industrial (52.4%), Commercial (4.1%), Residential (11.4%)
Fuel Share of Energy Consumption (2000E): Oil (48%), Natural Gas (18.7%), Coal (12.7%)
Fuel Share of Carbon Emissions (2000E): Oil (59.9%), Natural Gas (18.7%), Coal (21.4%)

Renewable Energy Consumption (1998E): 0.2 quadrillion Btu
Number of People per Motor Vehicle (1998): 9.1 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified December 22nd, 1994). Signatory to the Kyoto Protocol (June 17th, 1998).
Major Environmental Issues: Air pollution from industrial and vehicle emissions; water pollution from raw sewage; deforestation contributing to loss of biodiversity; soil erosion; desertification.
Major International Environmental Agreements: A party to the Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Wetlands and Whaling.
* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 2000

OIL AND GAS INDUSTRIES

Organization: Largely privatized. Empresa Nacional de Petróleo (ENAP) is the national oil and gas company. The National Energy Commission (NEC) is responsible for overall energy planning and tariff regulation.
Major Ports: Santiago, Puerto Montt, Concepción, Valparaíso
Major Oil and Gas Fields: Posesión, Daniel Este-Dungeness, Skua, Spiteful
Major Refineries (crude oil capacity): Petrox - Talcahuano (100,640 bbl/d), Refinería de Petróleo - Concon (94,350 bbl/d), Gregorio-Magallanes (9,859 bbl/d)

Sources for this report include: CIA World Factbook; Dow Jones News wire

service; DRI-WEFA Latin America Economic Outlook; Global Power Report; Economist Intelligence Unit ViewsWire; Financial Times; International Market Insight Reports; Janet Matthews Information Services; Latin American Energy Alert; Latin American Power Watch; Los Angeles Times; McGraw-Hill Companies,Oil and Gas Journal; Oil Daily; Petroleum Economist; U.S. Energy Information Administration; World Markets Online.

LINKS

For more information from EIA on Chile:
EIA - Energy Data on Chile
Summit of the Americas Fact Sheet

Links to other U.S. Government sites:
CIA World Factbook - Chile
U.S. State Department's Consular Information Sheet - Chile
Library of Congress Country Study on Chile
U.S. Embassy in Chile
U.S. International Trade Administration
U.S.-Chile Free Trade Agreement Draft Environmental Review (pdf file)

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National Law Center InterAm Database - Chile
University of Chile - Welcome to Chile
LANIC - Chile
Opportunities for the U.S. Energy Efficiency Industry in Chile
LatinWorld's section on Chile

The Latin American Integration Association (ALADI)
ARPEL, Regional Association of Oil and Natural Gas Companies in Latin America and the Caribbean
Latin American Gas online news
The Embassy of Chile in Washington, D.C.
ENAP - Chile's National Oil and Gas Company
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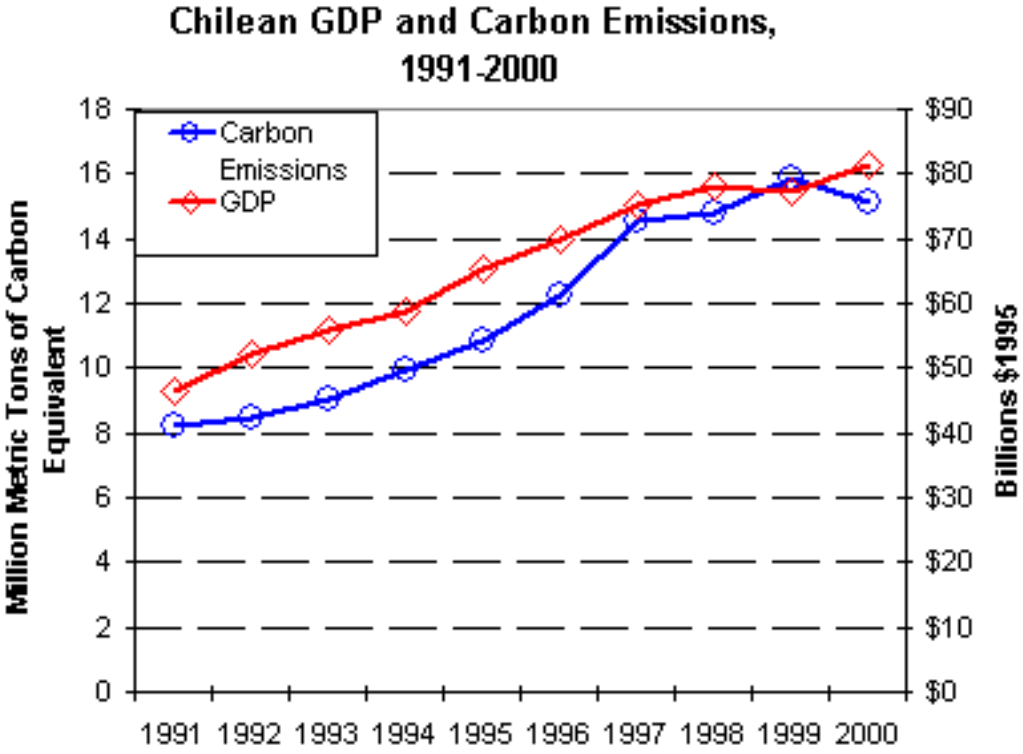
July 2002

Chile: Environmental Issues



Introduction

Chile's economy has grown quickly over the past decade. Total energy consumption has grown in tandem, resulting in increasing environmental degradation, particularly air pollution due to carbon emissions. Mitigating threats to the environment, however, is the increasing use of alternative fuels in Chile's industrial and energy sectors. Reliance on natural gas and hydroelectric generation to power the country has kept total carbon emissions in check over the past decade. In 2000, total carbon emissions actually fell for the year as GDP grew by 4.4%. (see graph)

But while alternative fuels are being employed by the industrial and energy sectors, the transportation sector is still strongly rooted in petroleum. Air pollution from vehicle emissions in Santiago, the country's capital, is the most obvious and and severe environmental problem in Chile. Copper mining, Chile's largest industry, also poses an environmental threat.

Air Pollution

The 5 million inhabitants of Santiago, Chile are exposed to high levels of air pollution during a significant portion of the year. Santiago ranks as one of the most polluted cities in the world and frequently confronts air-quality alerts and pollution emergencies. Air pollution in Santiago results in damaging respiratory diseases and a large number of premature deaths. Located in central Chile, the city sits in the middle of a valley and is surrounded by two mountain ranges: the Andes mountains and the Cordillera de la Costa. Because of Santiago's unique geographic location and weather patterns, ventilation and dispersion of air pollutants within the valley are restricted; thus explaining why Santiago, with emission levels similar to those in other cities, suffers from such high atmospheric pollution levels. The pollution problem is further exacerbated in winter when wind and rainfall levels are at their seasonal lowest.

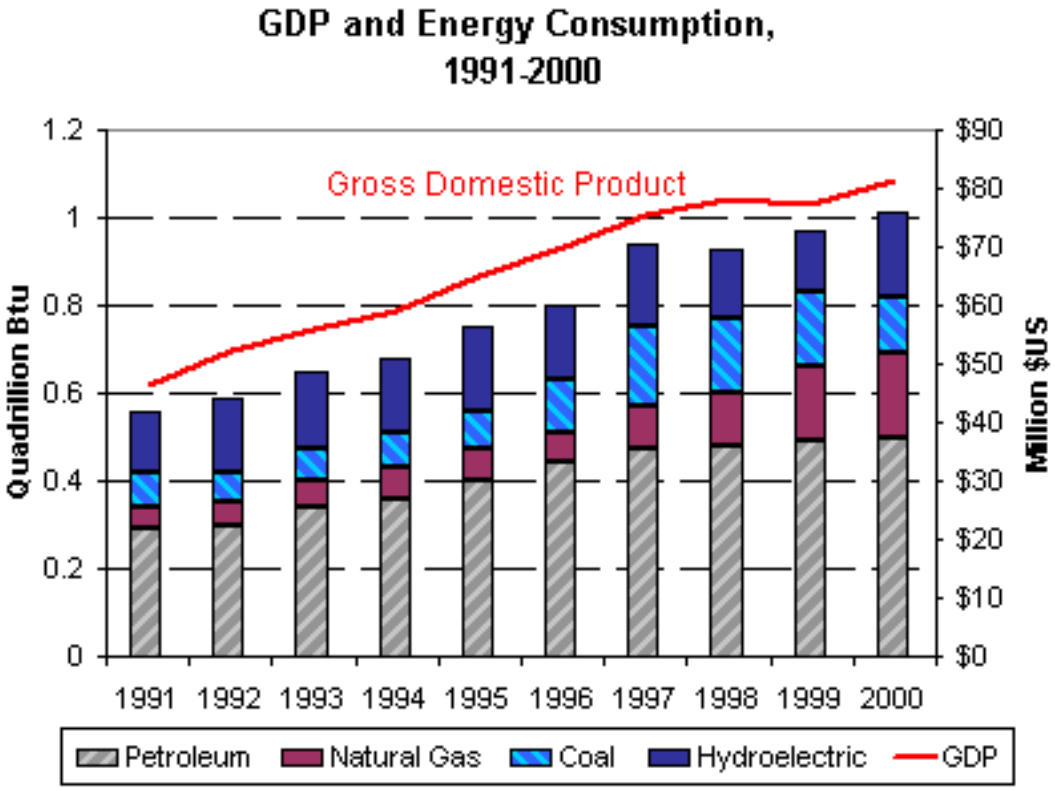
Besides geography and weather, air pollution in Santiago is a result of both mobile and fixed sources, a growing economy, rapid urban expansion and an increasing rate of automobile use. Although the city has a state-run underground metro system, cars and trucks are becoming increasingly popular as the number of private automobiles in Santiago has climbed to nearly 1 million. This trend is a significant threat to the improvement of Santiago's air, and is among the most important items on the national agenda. Since the early nineties, the country has taken numerous steps to address air pollution in both the short and long term.

Short-term measures include an air pollution alert system based on the maximum concentration of particles per cubic meter in the city's air, and a rotating schedule that restricts the number of cars allowed on the streets on given days. As recently as June 17, 2002, the government ordered 60% of Santiago's motor vehicles to stay off the streets, and forced 1,000 industries to remain idle for one day. In the longer-term, Santiago has partnered up with United States' Department of Energy's (DOE) Clean Cities International program to cooperatively increase the use of alternative fuels in Santiago's public transportation sector. In 2000, the program began converting diesel buses to run on compressed natural gas (CNG), and in May 2001, a prototype bus that runs on a hybrid (diesel-electric) fuel was introduced. So far, 500 taxis have been converted from gasoline to natural gas, and 12 of the city's diesel buses have been converted to CNG. Ultimately, Santiago and the DOE hope to generate a critical mass of vehicles that would allow for the installation of CNG service stations in the capital city.

Mining

Chile is the world's largest producer of copper, and industrial emissions in Santiago primarily arise from the mining sector and smelter operations. The process of mining contributes a considerable amount of pollutants to both the air and water; chief pollutants include sulfur dioxide, arsenic and suspended particulate matter. The smelting process of copper ore alone emits alarming amounts of arsenic and carbon monoxide into the air and water around the mines. The most threatened areas are those in the northern part of Chile, which holds the largest copper mine in the world -- Chuquicamata. CODELCO, the state-owned corporation which oversees the country's copper mining sector, had to shut down Chuquicamata for an entire month in 1994 as a result of environmental violations due to excessive fumes from the mine.

Fuel Mix and Carbon Emissions

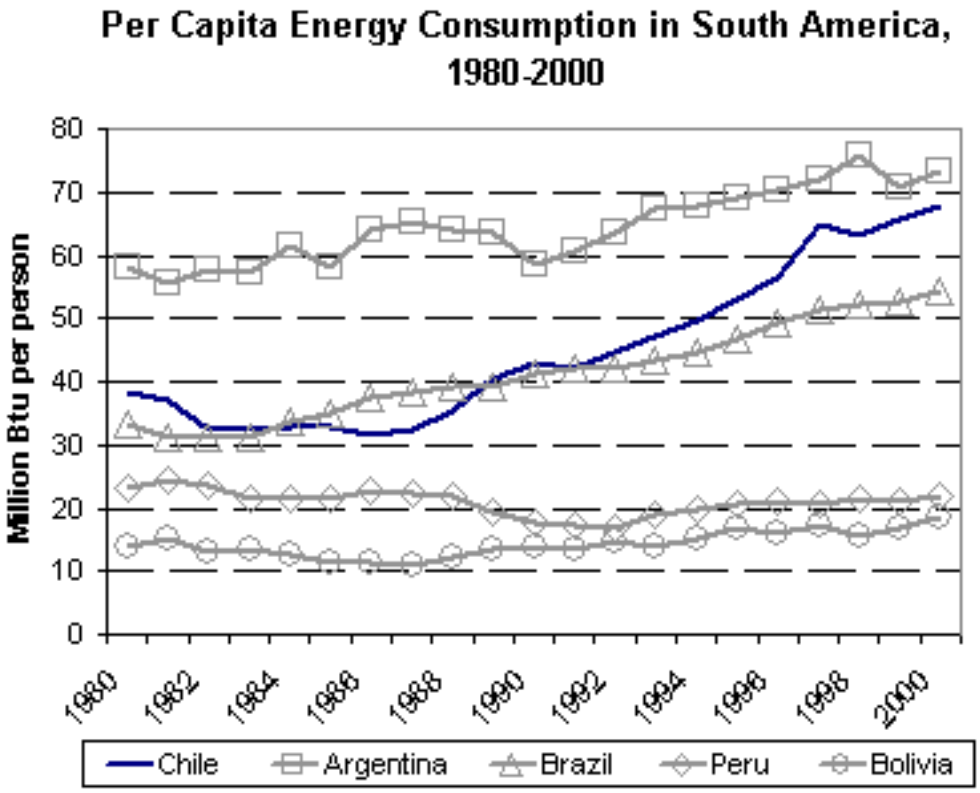


Hydropower from westward flowing rivers from the Andes Mountains has historically been Chile's single largest electricity source, at times comprising over half of the country's installed electric generation capacity. Coal has often served as a backup in instances of drought. Currently, the country is continuing to develop its fuel mix by increasing investment in hydroelectric facilities as well as building a sizable infrastructure for the importation of natural gas.

Since 1996, five new natural gas pipelines have been built to import gas from Argentina. Chile consumed 184 billion cubic feet (Bcf) of natural gas in 2000, almost three times its 1996 consumption levels. Natural gas, which is less polluting than coal or petroleum, currently fuels power plants and the industrial sector, primarily those located in the country's north. The introduction of natural gas into the urban transportation sector could be a significant step towards reducing Chilean carbon emissions, and thereby improving air quality in Santiago and across the country. In November, 2001 the government took significant steps towards this goal by advancing legislation to reduce the tax rate on natural gas and liquefied petroleum gas (LPG) in an effort to increase use of the fuels in public transportation.

The indigenous production and consumption of hydroelectric power has remained relatively stable over the past decade, but there are important new facilities on the horizon. Endesa (Spain) is developing the 570-MW Ralco hydroelectric project, located on the Bio Bio river, 310 miles south of Santiago. The project will account for an 18% boost in production to the Chilean central grid's current power supply. Completion was originally expected in 2003, but may be delayed due to pending litigation filed by displaced indigenous people as well as by damage caused by heavy rains in June 2001. Pacific Hydro (Australia) has purchased the water rights to build a 270-MW hydroelectric project on the Tinguiririca River, 93 miles south of Santiago. Construction is expected to begin in mid-2003.

Environmental Outlook



From 1973 to 1990, Chilean economic policy, under the country's military government, relied heavily upon mining, forestry, and fishing for export. These industries developed without environmental oversight and put serious strains on Chile's forests, soils, and wildlife. In 1990, a democratically elected government took power, and the country's economy began to grow quickly. While both the government and citizens of Chile have now become increasingly aware of the environmental costs of past economic expansion, recent economic growth puts new strains on the environment. Per capita energy consumption in Chile since 1990 has been South America's fastest growing, and is currently the continent's second highest after Argentina (see graph). Meeting the country's growing energy needs responsibly is key to Chile's environmental future.

Chile's current president, Ricardo Lagos, elected in January 2000, has exhibited a concern for the environment, and has demonstrated support for conservation efforts and fuel diversification. In March 2001, President Lagos announced the "Atmospheric Decontamination and Prevention Plan", which restricts overall bus travel on Santiago's city streets as well as the ability of vehicles to use leaded gas. Government support for the controversial Ralco hydroelectric project, however, has worried some environmentalists.

Observers are keeping an eye on the U.S. Congress in anticipation of the long-awaited U.S.-Chile bilateral trade agreement. The environmental component of the agreement, which is required by law, has thus far not been discussed between the two countries. The office of the U.S. Trade Representative, however, has released a report forecasting the environmental impact of bilateral cooperation and the Free Trade Area of the Americas on Chile. The report suggests that environmental degradation associated with forestry and mining, the two industries that tie the counties economically, is unlikely to increase as a result of a trade agreement. (see link in Chile Country Analysis Brief).

Chile has signed and ratified the United Nations Framework Convention on Climate Change as a non-Annex I country, and is therefore not obligated to reduce its emissions of greenhouse gases. Chile also is a signatory to the more recent Kyoto Protocol and is party to several other international environmental treaties, such as the Montreal Protocol and the Convention limiting the movement of hazardous wastes.

Chile's rapidly growing economy has come at a significant cost to the environment. With total energy

demand expected to continue to grow by 7% annually, and air pollution in Santiago already reaching critical levels, the continuing evolution of Chile's fuel mix away from petroleum and coal and towards natural gas and hydroelectric generation is key to the country's environmental future. The challenge in the years ahead will be to find a balance between meeting Chile's growing energy needs and strengthening the country's commitment to environmental protection.

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